DOCUMENT RESUME

ED 346 844 IR 015 632

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TITLE High Stakes Tests as Public Policy: How This Can Affect Adolescent Development and How Computers Can Be Used To Relieve Associated Problems.
PUB DATE 92
NOTE 18p.; Paper presented at a Computer Technology Conference (San Bernardino, CA, February 7, 1992).
PUB TYPE Viewpoints (Opinion/Position Papers, Essays, etc.) (120) -- Reports - Descriptive (141) -- Speeches/Conference Papers (150)

EDRS PRICE MF01/PC01 Plus Postage.
DESCRIPTORS *Adolescent Development; Aptitude Tests; Competence; *Computer Assisted Instruction; Dropouts; *Emotional Development; High Schools; Individual Instruction; *Microcomputers; Self Concept; Student Motivation; *Test Anxiety
IDENTIFIERS *High Stakes Tests; Scholastic Aptitude Test

ABSTRACT

The use of aptitude and competency testing in the public school system can have some undesired effects on students in terms of the stress and anxiety tests can impose. Adolescence is already a time in a child's life when many different pressures are coming to bear upon the psyche. Among the most undesirable consequences that can result from the additional pressures brought on by examinations such as minimum competency testing are increased dropout rates. The research literature indicates that microcomputers and computer assisted instruction can serve as excellent tools for relieving some of the problems associated with high stakes testing. Because of the computer's ability to provide individualized levels of instruction, non-threatening situations in which to learn and make mistakes, and high levels of feedback, reinforcement, and encouragement, it can serve as an excellent classroom aid which can reduce the probability of negative identity formation. The motivational qualities of the computer, in addition to its ability to facilitate instruction--reducing the amount of time necessary to convey the material--also serve to illustrate how the computer can potentially improve the overall quality of instruction in the classroom. (21 references) (DB)

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High stakes tests as public policy: how this can affect adolescent development and how computers can be used to relieve associated problems

by

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Abstract

The use of high stakes tests in the public school system can have some undesired effects on students in terms of the stress and anxiety they can impose. Adolescence is already a time in a child's life when many different pressures are coming to bear upon the psyche. Among the most undesirable consequences that can result from the additional pressures brought on by examinations such as minimum competency testing are increased drop-out rates.

The literature indicates that the computer can serve as an excellent tool for relieving some of the problems associated with high stakes testing. Because of the computer's ability to provide individualized levels of instruction, non-threatening situations in which to learn, and high levels of feedback, reinforcement, and encouragement, it can serve as an excellent classroom aid which can reduce the probability of negative identity formation. The motivational qualities of the computer, in addition to its ability to facilitate instruction--reducing the amount of time necessary to convey the material--also serve to illustrate how the computer can potentially improve the overall quality of instruction in the classroom.

Introduction

Competency testing is a topic which has both positive and negative aspects. Arguments can be made stating that such testing makes the educational system as a whole "accountable." By requiring such testing of students prior to advancement to subsequent educational levels, an attempt is being made to insure that students have some minimal skills that everyone should possess. Meaningful standards are established which remain the same from teacher to teacher and from school to school. It can be stated that a common standard of performance is established through the use of minimum competency testing. Specific goals and objectives are also established when such testing is implemented. Rather than relying on a vague set of expectations, specific outcomes are determined. Also, minimum competency testing can have the benefit of providing greater public awareness of educational outcomes.

It seems clear that many benefits can arise from the use of minimum competency testing. The overall quality of education can be studied, and monitored using this device. It seems to be a potentially effective means of keeping the educational system as a whole under close scrutiny.

It should be mentioned, however, that there are also disadvantages and possible negative effects that can result from the use of minimum competency testing. These disadvantages are:

1) The cost of developing such tests;
2) Test control (tests that determine or control the curriculum);
3) Establishing standards and identifying levels of performance can be difficult and is often arbitrary;
4) By emphasizing the concept of passing as many students as possible, mediocrity be promoted;
5) Students who persistently fail may be more inclined to drop out of school;
6) Such testing can promote bias against certain groups of students--especially

those with special needs.

(Wiersma, Jurs, 1989).

Each of the negative effects should be addressed individually. On the issue of cost, the establishment of minimum competency testing is generally expensive (Wiersma, Jurs, 1989). Time, money, and the cooperation of many experts must be obtained to establish standardized tests that will be used for large numbers of students. Revisions and printing costs add additional expenses.

Allowing the test to control the lesson can be a very serious problem. Teachers "teaching to a test," especially in instances where teacher accountability is tied in with the testing program can reduce the quality of instruction the student receives (Wiersma, Jurs, 1989).

The issue of establishing standards is a potential problem. Ultimately, the questions of which standards will be included and what levels of performance will be considered satisfactory will arise. Who will establish these standards? Subjectivity invariably enters into the process at some point. The issue of having arbitrary decisions is one that must certainly be recognized.

AS school administrators attempt to push as many students through the system as possible, certain groups may be ignored. In particular, gifted or talented students may find that their educational environments are less stimulating, as the focus of the class shifts towards passing larger and larger numbers of students subsequent tot he attainment of specific skills (Wiersma, Jurs, 1989).

Drop-out rates are already high enough in the United States without having another factor contribute to the problem. Yet, the existence of minimum competency testing may lead to high levels of frustration on the part of "borderline" students. Individuals who consistently fail such tests may be led to think that their participation in the educational system is a "waste of time." Although not the actual intent, the policy of requiring these

students to take such tests can result in negative self image and self esteem (Gross, 1989; Wiersma, Jurs, 1989).

Finally, there is the issue of affecting those students with special needs. Minorities, as well as those students with educational handicaps or disabilities may be unfairly labeled as a result of minimum competency testing (Reilly, 1983). Again, it is not the intention of such testing to reduce the overall self images of these particular groups. Yet, these undesirable effects may in fact, result from the failure of these groups to attain certain standards.

Many states have advocated the establishment of minimum competency testing in their schools. The reason for this stems from a perceived deficiency in the quality of education. Specifically:

> Much of the motivation for minimum competency testing--especially in states where it has been legislated comes from attempts to correct perceived deficiencies in schools. This attitude is unfortunate for two reasons. First, in many situations, minimum competency testing is favored by people outside of education. Although they may mean well, these individuals are often not well informed about the complexities of the issue and quite frankly, are not qualified to deal with the problem. In addition, there is considerable confusion about the types of deficiencies that minimum competency testing can address. For example, it is argued that minimum competency testing is necessary because SAT scores have been declining over the years. The majority of students who take the SAT would have no difficulty passing a minimum competency test. However, doing so would not likely raise SAT scores. Such competency programs are not designed specifically to increase performance on the SAT and it is unlikely that they will do so even indirectly. The rationale for minimum competency testing must include a consideration of realistic benefits. (Wiersma, Jurs, 1989, pp. 355-356).

The Scholastic Aptitude Test

Another examination which is known to result in high stress amongst adolescents is the Scholastic Aptitude Test, or SAT. The SAT is an examination that is used as part of the criteria for admission to colleges and universities. It is broken down into verbal and quantitative sections--all multiple choice (Crouse, Trusheim, 1988). SAT scores, along with high school GPA are used together by colleges and universities to help predict the grades of college students during their freshman year (Crouse, Trusheim, 1988). The

basic premise is to try and determine the level of success that these students will attain, which will then make the screening process of who is admitted and who isn't an easier one.

Studies on the validity of the SAT have revealed that in predicting freshman grades, the SAT in conjunction with high school records does in fact help increase the multiple correlation coefficient by 0.06 to 0.08 over high school records alone (Wiersma, Jurs, 1989). Although these numbers are statistically significant, the overall improvement in predicting the success of high school students who go on to college is limited. Coefficients of determination for these correlations would only be 0.036 to 0.064. In other words, the chances of predicting success for college freshmen is only improved by 4 to 6 percent (Crouse, Trusheim, 1988). Indeed, Crouse and Trusheim (1988) have concluded: "Our results show that for a vast majority of colleges, an admission policy that ignores the SAT admits almost the same freshman class as an admissions policy that includes the SAT." (Crouse, Trusheim, 1988, p. 363).

A problem that arises is that many high school students and their parents view the SAT as an indicator of specifically which university will be attended, and in some instances, how successful a person will be later in life (Wiersma, Jurs, 1989). Based on the actual predictive power demonstrated by statistical analysis, it seems that the estimation of importance attributed to this examination is overestimated to an extreme. The point remains, however, that this test has and will likely continue to have a significant impact on the emotional states of adolescents taking the test, not to mention their parents.

Problems with Identity

The effects that both minimum competency testing, and perhaps to a lesser extent, SAT scores can have on an adolescent should be of some concern to policy makers. The problem is that poor performance on either test can result in negative self image. Erik Erikson has pointed out that human beings go through a series of stages in their "life

cycles." During infancy, the "crisis" that occurs is one of Trust vs. Mistrust. In early childhood, the conflict becomes one of Autonomy vs. Sham/Doubt. In stage 3, or the "play age," the conflict is Initiative vs. Guilt. In the fourth stage (school age), there is Industry vs. Inferiority. In the fifth stage, which is adolescence, the conflict is **Identity vs. Identity diffusion.** (Erikson, 1980, p. 129).

During adolescence, the individual must come to grips with who he was as a child, who he will be in the future, and how this self image is perceived and recognized by the group to which he belongs (Erikson, 1980). The individual needs to be positively recognized by his/her peers, parents, and other significant persons with whom interaction takes place. The individual must also cope with mounting demands and responsibilities that are developing in everyday life. A normal, healthy person can deal with these increased demands and adapt to the total number of roles in which he participates. The idea of what this person intends to become is accepted by the members of the community at large. Such a person is developing a strong identity that is acceptable not only to himself , but to those people who occupy positions of importance around this individual (Erikson, 1980). Progression to subsequent stages in the life cycle would be normal for the individual just described.

There are those people, however, who do not cope so easily with the idea of who they are. These people find the decision making process of "what to do at what time," to be very difficult. Environmental factors contribute to the difficulties encountered by these individuals, who cannot decide on what tasks to undertake, what mental age they should occupy (diffusion of time perspective), or who are excessively aware of and dislike competition and rivalry (diffusion of industry) (Erikson, 1980). Essentially, the person becomes "labelled," with a negative social role, or assumes such a role because certain "undesirable" traits possessed by the individual have been over-emphasized. It is also possible that the person feels that he will be unable to attain a certain level of

accomplishment. Thus, assuming a negative role, or identity, gives the person a greater feeling of security.

> In other cases, the negative identity is dictated by the necessity of finding and defending a niche of one's own against the excessive ideals either demanded by morbidly ambitious parents or seemingly already realized by actually superior ones: in both cases the parents' weaknesses and unexpressed wishes are recognized by the child with catastrophic clarity. (Erikson, 1980, p. 142).

> Such vindictive choices of negative identity represent, of course, a desperate attempt at regaining some mastery in a situation in which the available positive identity elements cancel each other out. The history of such a choice reveals a set of conditions in which it is easier to derive a sense of identity out of a total identification with that which one is least supposed to be than to struggle for a feeling of reality in acceptable roles which are unattainable with the patient's inner means. (Erikson, 1980, p. 142).

> At any rate, many a late adolescent, if faced with continuing diffusion, would rather be nobody or somebody bad, and this totally or indeed, dead--by free choice--than be not quite somebody. (Erikson, 1980, p. 143).

The point is that adolescents are quite vulnerable at this stage in their emotional developments. It is inappropriate to ascribe labels to children of this age, because the negative effects this can impose can be catastrophic. What is unfortunate is that although devices such as minimum competency testing or the Scholastic Aptitude Test have positive features--and in many ways can be justified, there is also the possibility that the wrong information can be communicated to students and their parents alike. A person's life should not be controlled or dictated according to his performance on a few tests. Similarly,m the individual's self perception should not be shattered or radically altered due to these performances. Yet, these are very real possibilities that cannot be overlooked.

Because public opinion currently favors the continued use of minimum competency testing and aptitude tests such as the SAT, it is likely that the use of these devices will continue for some time. With this in mind, perhaps the best way of helping adolescents to deal with the stress associated with these tests is to provide an educational environment which will encourage success. This can be done by: 1) Providing students with a non-threatening learning environment in which errors can occur and where they will be

encouraged to learn from them; 2) Improving the quality of the lesson through the use of interactive, individualized instruction; 3) Allowing students to learn via their most powerful sensory mode; 4) Giving students patient, non biased instruction; 5) Providing students with appropriate levels of feedback (information on where they are doing well, where they went wrong, and in what areas improvement should be made); and 6) Providing students with a more motivating situation. With class loads exceeding acceptable limits in many public schools across the country, this might seem unrealistic. It may be possible, however, that technology can provide a partial solution.

Computer in the Classroom

The computer is a device which can address many of the points that were outlined in the previous section. The following documents the ways in which the computer addresses each of the areas discussed.

A) Providing students with a non threatening situation--Many students have grown up with the computer as a permanent fixture in their worlds. It is a device which many see as a "facilitator." Studies have been conducted in which the computer has been seen to remove much of the "mental drudgery" associated with typical class work (Walker, 1983). As an example, word processing programs are known for removing much of the tedium associated with writing and editing text. Students using word processing packages have been found to feel better about their writing because the finished document looks good (erasures and other errors are eliminated through the use of word processing packages). Studies have shown that students tend to write longer, more detailed text; they are more willing to edit mistakes; and the overall quality of text in terms of grammar, punctuation, and organization of thought) is improved substantially (Lockard and Abrams, 1987). Students can work as long as they wish in areas they need to concentrate upon. The computer does not impose restrictions in the same way that a regular teacher might. To summarize, students feel more comfortable with the process of writing.

B) Improving the quality of the lesson through the use of interactive, individualized instruction--students using computers are given the opportunity to work with the machine on a one on one basis. The student is not a passive learner, but is given the opportunity to respond to prompts given on the computer screen (Bitter, 1984). In other words, the learner is an active participant in the learning process. During the lesson, the student will generally have complete control over the rate at which materials are presented. The learner is essentially given a chance to learn at the "speed of thought." When information is passed on to an individual at just the right speed and in just the right mode, it tends to be assimilated most readily (Walker, 1983). Individual levels of instruction such as this are not possible for all students under a standard "lecture format." Under those circumstances, there are always students who learn quickly (who are likely to be bored), there are students who learn more slowly (who are likely to miss the point and become frustrated), and there are some students who can follow along at just the right rate. Usually, a teacher must orient his lecture to accommodate the widest audience--insuring that certain students will be neglected.

C) Allowing students to learn via their most powerful sensory mode--Computers are flexible in that they can receive information in multiple modes (keyboard, trackball, light pen, mouse, etc.), and they can also present information in multiple modes (monitor, speech synthesizer, Braille, printers, etc.) (McKeown, 1987). Because of this versatility, it is possible that students can input and receive information in ways that suit their needs. Specifically, the computer is capable of addressing visual learners, auditory learners, or even tactile learners. Appropriate hardware and software must exist to harness these capabilities.

Studies have revealed that in helping the learning disabled and educationally handicapped, the computer is a very effective tool (Carnine, 1989; Graham and MacArthur, 1988; Moore, 1984). By providing the appropriate modes and rates of instruction, the

computer has helped students attain higher levels of achievement in areas such as geography, mathematics, word recognition, and writing ability.

D) Giving students patient--non biased instruction. The computer is known as a device that is designed to handle repetitive functions without ever tiring (Wu, 1975). Because it is a machine, it obeys specific instructions that it receives. The computer, therefore, is a device with infinite patience, and one that will never lose its ability to handle multiple questions from a student or several students (Bitter, 1984). The computer will provide the student with as much or as little practice as is necessary for each individual. Indeed, certain instructional programs known as "drill and practice" are designed specifically to provide students with repetition of essential skills (Lockard and Abrams, 1987). In many instances, repetition is exactly what is needed for a student to achieve desired levels of proficiency within certain subject areas--to "learn by doing."

D) Giving students appropriate levels of feedback--Properly designed instructional programs always provide students with feedback on what they have accomplished (Walker, 1983). The student (as well as teacher) is able to monitor his/her performance, and judge which areas may require more immediate work. Some sophisticated types of instructional software will tell the student specifically what is being done incorrectly, and will help to reinforce or strengthen these areas of weakness (McGrath, 1984). The computer in this instance, acts as a diagnostic tool for both student and teacher alike. As a classroom aid, the computer is known to provide relief to teachers by alleviating some of the burden that results from trying to meet the needs of students with varying levels of ability.

F) Providing students with a more motivating environment--A very important research finding is that students working with computers have a greater desire to pursue the mastery of subject matter (Gross, 1989; Lockard and Abrams, 1987). Such motivation increases are displayed in the forms of longer writing projects, higher levels of concentration during lessons, and less wasted time during the class period overall. In certain instances, "At Risk Students" have been known to perform exceptionally well when

under a program of computer assisted instruction (Gross, 1989). The computer acts not only to improve the quality of instruction through individualization and zeroing in on the specific needs of the student, but it also stimulates high levels of self confidence in students.

The following example illustrates how student motivation can be dramatically increased through the use of the computer in the classroom.

In Escambia County, Florida, a CAI pilot project indicated that some students would show up for school ONLY to work with the computer, and would leave school after their CAI time was over (Gross, 1989).

Students' remarks are revealing: "The machine doesn't know I'm black," "It doesn't hate me," "It gives me a second chance," and "I can do it," are typical of the comments reported by computer proctors. The sense that the computer is on the student's side probably can be attributed to 3 features.

First the program drops to an easier level if students despite the program's tutorial help, miss several consecutive exercises of one type, they don't get discouraged. And because it advances them if they get several consecutive questions of one type right, they don't get bored.

Second, the program creates new problems by choosing numbers at random so students who need a great deal of practice in one area never get a sense of deja vu.

Third, the program's supportive comments--"Good work Darrell" come at random times interspersed with award ribbons indicating correct answers. And mistakes are non-public and corrections are administered with infinite patience." (Gross, 1989, p. 50).

Motivation is one of the key points in getting students to learn any kind of material. The computer has been proven as an effective means to this end.

Overall Research Findings

In the past 30 years, a large body of information has been accumulated on the effects of CAI. To summarize some of the major findings, information is presented in the areas of achievement, learning retention, learning time, and attitudes.

In students ranging in grade levels from 6th to 12th grade, achievement has been found to increase significantly on objective tests (Kulik, Bangert and Williams, 1983). Performance was estimated to have increased by 0.32 standard deviations for students using computer assisted instruction in addition to regular classroom techniques. In addition, ETS (Educational Testing Service) found that students using CAI performed significantly higher in mathematics on both long and short term bases (Bracey, 1984). The literature contains many other examples of where increases in performance have been observed through the use of CAI.

Learning retention is another area that seems to be stimulated by CAI. Based again upon performance on standardized tests, students using CAI seemed to retain information more effectively than students in a control group (Kulik, 1983; Roblyer, 1985). It should be noted, however, that these observed increases in learning retention were marginal, and should not be over-emphasized.

In the area of learning time, CAI has been shown to reduce this quantity dramatically. The Army has demonstrated a 10% reduction in required learning time for electronics training (Blaschke and Sweeney, 1977). Studies conducted by Dence (1980), Fisher (1983), and Lunetta (1972), have shown that in certain instances, learning time is reduced by amounts exceeding 85%. Finally, Hotard and Cortez (1987) have reported gains of 1.5 grade equivalents in math, and 1.2 grade equivalents in reading over an 8 week period (a total of 15 actual hours in math and 14.2 actual hours of reading during the course) for high risk adolescents placed in a special CAI course.

Student attitudes are known to improve with the use of CAI. Students have been known to react favorably to the use of CAI for instructional purposes. The same study indicates that students exposed to the computer in this manner are more likely to have favorable attitudes towards computer use than those students trained by conventional means (Bracey, 1984).

Student attitudes have also been found to be more favorable towards actual subject matter. Kulik (1983), found that out of 10 studies related to student perceptions of subject matter subsequent to the use of CAI, 8 showed that student attitudes had improved. It should be noted that many factors can affect this particular variable, such as teacher preparation, quality of software, availability of proper equipment, etc.

Discussion

Adolescence is clearly a strenuous time both cognitively and emotionally for the individuals concerned. External pressures added during this time, such as accountability in the form of competency testing, and tracking in the form of aptitude testing, can have some very negative effects. The purpose of the educational system, in addition to checking on itself, is to promote as much widespread success as possible. Public policies, although intended to improve the system, can sometimes have undesirable consequences (such as increased drop out rates, levels of frustration, and negative labelling). It is this new set of problems that must be addressed when policies such as "high stakes" tests are mandated.

The computer presents on possibility that can help to address these problems. As an educational aid, the computer is a very effective tool in promoting the overall quality of instruction. Research shows that the computer can effectively improve self esteem in students by creating non-threatening situations in which success is rewarded, encouraged, and facilitated. Adolescents need this kind of reinforcement, especially since this period in their lives is one in which diffused or negative identities can be manifested. The key issues will be to effectively train teachers in the use of the computer, supply the appropriate

equipment and software to public school systems, and finally to use the tool effectively to improve the overall success of students. The importance of using the computer lies in the fact that it can overcome the problems of negative labelling and self perception. As technology continues to improve--along with associated decreases in hardware costs, the computer may help to revolutionize the field of education.

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